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Press Conference on 07 May 2025 after successfull complition of Op Sindoor

Image Courtesy: PIB

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"India Will Track, Identify And Punish Every Terrorist. India Will Pursue Them To The Ends Of The Earth."

- Shri Narendra Modi
H'ble Prime Minister of Indian on Pahalgam Attack

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Opinions and Analysis

21 Terror Camps Razed, 70 Terrorists Killed: Operation Sindoor's Devastating Effect on Pakistan, PoK

08 May 2025

Source: Firstpost | https://www.firstpost.com/explainers/operation-sindoor-21-terror-camps-razed-terrorists-killed-devastating-effect-pakistan-13886546.html

Members of the media film the inside of the terror camp in Bahawalpur after it was struck by India's Operation Sindoor. Reuters

As people slept soundly in their homes in the wee hours of Wednesday (May 7), the Indian Armed Forces carried out its most daring strikes in Pakistan and Pakistan-occupied Kashmir (PoK) under the codename Operation Sindoor.

The ' coordinated and precision' strikes carried out by the Indian Army, Air Force and Navy took out 21 terror camps across nine locations linked to three major terror outfits — Maulana Masood Azhar's Jaish-e-Mohammed (JeM), Hafiz Saeed's Lashkar-e-Taiba (LeT), and Syed Salahuddin's Hizbul Mujahideen (HM).

Following the completion of Operation Sindoor, the Indian Army posted on X, "Justice Served" — as the military action was part of a "commitment" to hold "accountable" those responsible for the Pahalgam terror attack of April 22 in Kashmir in which 26 people had been killed.

But even as India hailed Operation Sindoor's success, Pakistan raised doubts about the efficacy of the strikes, with Pakistan Prime Minister Shehbaz Sharif calling it a "cowardly attack" and warned of further consequences.

Amid this, we analyse the impact of Operation Sindoor on the ground as well.

Terror Camps Reduced to Rubble

Operation Sindoor took aim at five terror bases in PoK and four in Pakistan, targeting the terror groups of LeT, JeM and HM, which have long carried out attacks in India.

Of the 21 sites, the key targets were JeM's headquarters, Markaz Subhan Allah, in Bahawalpur, and Muridke Markaz, which has long been considered the operational and ideological heart of the LeT, and infamous for being Pakistan's "terror nursery. In fact, it is at this camp that 26/11 terrorists Ajmal Kasab and David Coleman Headley received training for the attacks.

Now, a day after the strikes, satellite imagery and videos reveal the extent of damage that India has caused to these terror bases.

Satellite images from Colorado-based Maxar Technologies captured both before and

after the strike visuals, clearly show the impact of the operation at terror camps in Bahawalpur and Muridke, two major hubs of banned terror outfits.

Reuters reports that there was no loss of civilian life at the Bahawalpur camp as it had moved its students in recent days as speculation grew that it would be targeted by India. However, Masood Azhar, one of India's most wanted terrorists and the chief of the JeM claimed that 10 members of his family had been killed in India's strikes.

The terrorist said that he had lost his elder sister, her husband, a nephew and his wife, a niece, and five children from the extended family. "Ten members of my family were blessed with this happiness together tonight… five are innocent children, my elder sister, her honourable husband. My scholar Fazil bhanje (nephew) and his wife and my beloved scholar Fazilah (niece)… my dear brother Huzaifah and his mother. Two more dear companions," he said, saying that those killed have become the guests of Allah.

Operation Sindoor Kills Terrorists

In addition to striking at the hearts of the terror infrastructure in Pakistan and PoK, Operation Sindoor also wiped out numerous 70 terrorists, with no civilian loss of life.

India's Defence Minister Rajnath Singh stated that Operation Sindoor eliminated those who targeted and killed innocent civilians. "The operation reflects not just our military precision but also our moral restraint. In the words of Lord Hanuman: 'Jin mohi maara, tin mohi maare'. This means we struck only those who harmed our innocents," he said.

In the all-party meeting on Thursday (May 8), he is quoted as saying that around 100 terrorists were eliminated. "In Operation Sindoor, precise strikes were carried out on nine terrorist hideouts. Around 100 terrorists were killed. Confirmed information is still awaited, and counting is ongoing," sources quoted the government as having informed the all-party meeting.

Top security sources also added that restraint was exercised in selecting targets and executing the operation.

Reports have also come in that India's strikes managed to eliminate JeM terrorist Yaqub Mughal, head of the Markaz Syedna Bilal camp in Muzaffarabad. This base has a presence of 50-100 terrorists, and was used as a training centre for the JeM cadre.

'The Sky Turned Red'

Residents of Pakistan and PoK have described the moment they saw Indian missiles rain down on Wednesday night as part of Operation Sindoor. A local in Pakistan's Muridke said he saw four drones. "It was around 12:45 in the night. We were asleep… one drone came first, followed by three other drones, and they attacked the mosques… everything is destroyed," he said while speaking to news agency Reuters.

Another witness added, "We were sleeping

on the roof. The first missile came with a loud sound. Three more followed, and one even passed directly over us. The sky lit up and it felt like the sky turned red."

Most locals added that there was still fear and panic amongst them, as they were unsure of what the future holds.

Impact of Operation Sindoor

Besides the physical damage that Operation Sindoor has caused to terror camps, the Indian strikes have also sent a strong message to the world. In the press briefing, Indian officials stated that Operation Sindoor was not just about the terrorist attack in Pahalgam last month. Rather, it was a response to all significant acts of terrorism sponsored by Pakistan since the attack on Parliament in 2001.

Analysts believe it's a huge blow to Pakistan and its image on the global stage. Operation Sindoor severely diminishes Pakistan's ability to hide behind the lack of conclusive evidence to show the Pakistani state's complicity in terror attacks against India.

Security analyst Aadil Mir also told ANI: "India has crossed two significant thresholds… striking multiple sites and targeting Pakistan's heartland. This goes far beyond 2019."

Additionally, Operation Sindoor has pretty much ended the old India-Pakistan relationship. There is little chance of relations going back to the old format of comprehensive/composite dialogues, discussions on Kashmir, people to people cooperation etc. Even the start of conversations to establish normal relations with Pakistan will take considerable time and effort.

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India Needs to Recruit Global Aerospace Talent, Including Diaspora, to Build 120kN AMCA Engine Successfully, Urges Former NSAB Adviser

Raghav Patel | 03 May 2025

Source: Defence.in | https://defence.in/threads/india-needs-to-recruit-global-aerospace-talent-including-diaspora-to-build-120kn-amca-engine-successfully-urges-former-nsab-adviser.13953/

India must adopt modern strategies, including hiring international experts and acquiring existing technologies, to successfully develop the crucial 120kN engine intended for its future Advanced Medium Combat Aircraft (AMCA), according to Anshuman Tripathi, an international aerospace and defence consultant and former adviser to the National Security Advisory Board (NSAB).

Speaking recently, Mr. Tripathi stressed that learning from global precedents and India's own experiences is vital to accelerate the development timeline for this critical defence project.

Mr. Tripathi used the example of Nokia, a former mobile phone leader overtaken by Apple, to illustrate his point. He recalled the words of Nokia's last CEO, who reportedly stated, "We didn't do anything wrong, but somehow we lost."

Mr. Tripathi suggested a parallel with India's persistent efforts in jet engine development, particularly by the Defence Research and Development Organisation's (DRDO) Gas Turbine Research Establishment (GTRE).

Despite dedicated work, India has yet to produce a fully operational indigenous jet engine for fighter aircraft. "Everybody put in their best, but we don't have what we need," he observed, calling for a fundamental change in strategy.

Highlighting how other nations secure advanced capabilities, Mr. Tripathi pointed to China's development of its J-20 stealth fighter. He noted that China achieved this not primarily through government deals or reverse engineering alone, but by recruiting Nosher Gawadia, an engineer with experience in U.S. stealth technology.

"China didn't rely on reverse engineering alone; they hired the right person and gave him resources," Mr. Tripathi explained, emphasizing the effectiveness of acquiring talent.

He reminded the audience of India's own past success with the HF-24 Marut fighter, developed with the expertise of German designer Kurt Tank in the 1960s. Mr. Tripathi advocated for a similar strategy today, urging India to actively recruit global talent. This includes reaching out to experts of Indian origin working abroad on advanced projects like the F-35, who may be willing to return and contribute to India's defence capabilities.

Mr. Tripathi also highlighted a significant missed opportunity during the 2021-2022 period when ATP Aero, a Spanish company possessing a Eurofighter Typhoon manufacturing facility, was acquired by Bain Private Equity. He pointed out that this facility, capable of producing aerospace components including engines, could have significantly boosted India's capabilities, but India did not attempt to acquire it.

He lamented the absence of suitable private equity structures or infrastructure within India to facilitate such strategic technology purchases and called for establishing mechanisms to acquire key technologies, benefiting not just defence but wider industry.

Acknowledging the difficulties GTRE and DRDO face in retaining skilled engineers who often move to the private sector, Mr. Tripathi proposed creating a framework to attract global experts.

This system should facilitate collaboration between these experts, including the Indian

diaspora willing to offer their services, GTRE, and private Indian companies, enabling a productive exchange of talent and knowledge.

Addressing questions regarding Hindustan Aeronautics Limited's (HAL) long-standing efforts in engine production, Mr. Tripathi stated that HAL may not have received adequate support.

He referred to a past DRDO study concerning the possibility of reverse-engineering the Russian AL-31FP engine (used on Su-30MKI fighters) and recommended that the Ministry of Defence (MoD) thoroughly review its findings.

He stressed the importance of determining if such an engine would meet Air Force requirements, be adaptable to other aircraft, or have export potential, insisting that the armed forces must be integral to such evaluations.

Finally, echoing a 2019 critique of the indigenous Kaveri engine program by Admiral Arun Prakash (Retd.), Mr. Tripathi reiterated key shortcomings: DRDO's potential overconfidence, an apparent reluctance to seek external help, and insufficient involvement of the military end-users.

He asserted that these lessons are crucial and must inform the strategy for developing the vital engine for the AMCA, India's ambitious fifth-generation fighter program aimed at enhancing strategic autonomy.

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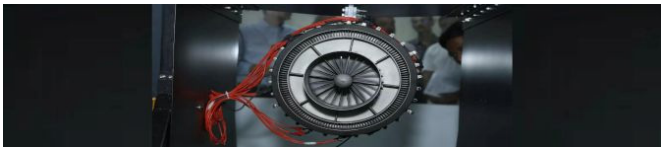
SiriNor's Revolutionary All-Electric Jet Engine: A Breakthrough in Sustainable Aviation

03 May 2025

Source: Indian Defence News | https://www.indiandefensenews.in/2025/05/sirinors-revolutionary-all-electric-jet.html



Via X

SiriNor, a deep-tech aerospace start-up, has successfully completed ground testing of what is being hailed as the world's first scalable all-electric jet engine at its Pune facility. This milestone achievement represents a significant breakthrough in sustainable aviation technology, validating the engine's Technology Readiness Level 6 (TRL-6) under NASA's framework.

The proprietary propulsion system exceeded its design benchmarks by achieving over 40,000 RPM and delivering 10 kilograms-force (kgf) of thrust, demonstrating its commercial viability for future aviation applications. With a power-agnostic design that eliminates combustion and reduces manufacturing and maintenance costs significantly, SiriNor is positioning itself to disrupt the global jet engine market projected to reach USD 100 billion by 2030, implementing a phased commercialisation approach beginning with UAVs in 2026 and culminating with regional aircraft by 2030.

Ground Breaking Electric Propulsion Technology

SiriNor's electric jet engine represents a fundamental shift in aviation propulsion technology, moving away from traditional combustion-based systems toward clean, efficient electric alternatives. The all-electric jet engine has successfully achieved Technology Readiness Level 6 (TRL-6) under NASA's framework, which indicates that the technology has been validated in a relevant environment and is advancing toward commercial viability.

The engine's performance during on-ground testing has been exceptional, surpassing its design targets by reaching over 40,000 RPM and delivering 10 kilograms-force (kgf) of thrust, proving its capacity to deliver the power necessary for practical applications. This achievement marks a crucial milestone in the development of scalable, zero-emission propulsion systems that could revolutionise the aviation industry.

The innovative engine architecture employs a unique tip-driven propulsion design that distinguishes it from conventional jet engines. Unlike traditional engines with a central hub, SiriNor's technology utilises distributed edge-mounted motors, which results in lower thermal loads and significantly simplified manufacturing processes. This approach enables greater scalability and adaptability across various aircraft platforms.

Furthermore, the engine's power-agnostic design is compatible with both battery systems and hydrogen fuel cells, allowing for flexible implementation depending on the specific application requirements and available infrastructure. This versatility is particularly valuable during the transition period toward fully sustainable aviation, as it allows aircraft manufacturers to adopt the technology based on their existing capabilities and future energy strategies.

By eliminating combustion and the need for exotic materials typically required in conventional jet engines, SiriNor's electric propulsion system offers substantial cost advantages. Manufacturing costs are reduced by approximately 30%, while maintenance requirements are cut by about 40% compared to traditional jet engines.

These economic benefits, combined with the environmental advantages of zero-emission operation, create a compelling value proposition for aviation manufacturers and operators facing increasing pressure to reduce both costs and carbon footprints. The modular architecture also simplifies retrofitting existing aircraft, potentially accelerating industry-wide adoption of electric propulsion technology across various aviation segments.

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How Rampage Missiles Transform the Indian Navy's MiG-29Ks into Precision Weapons

27 Jan 2025

Source: Army Recognition | https://armyrecognition.com/news/aerospace-news/2025/how-rampage-missiles-transform-the-indian-navys-mig-29ks-into-precision-weapons

In April 2024, the missile was also integrated into the Indian Air Force's fleet, including Sukhoi Su-30MKIs, Jaguars, and MiG-29s (Picture source: X Channel @ manjeetnegilive)

The Rampage missile, with an operational range of 250 kilometers and supersonic speed, provides advanced strike capabilities that allow the engagement of high-value targets while remaining outside the reach of enemy air defense systems. Its integration transforms the MiG-29Ks into modern platforms capable of addressing complex strategic objectives.

Developed by Israel Aerospace Industries (IAI) and IMI Systems, the Rampage is a precision long-range air-to-surface missile designed for strategic strikes. Measuring 4.7 meters in length and equipped with the Range Extension and Smart Tail (REST) kit, it combines performance and operational flexibility. With an accuracy of 10 meters CEP (circular error probable), it can target critical infrastructure such as airbases, command centers, ammunition depots, as well as logistical and communication hubs. Its inertial and GPS-based navigation system, with anti-jamming capabilities, ensures optimal performance under all weather conditions and at any time of day while minimizing collateral damage. Its adaptability to urban environments further underscores its relevance in modern combat scenarios.

The Rampage's acquisition is not limited to the Indian Navy. In April 2024, the missile was also integrated into the Indian Air Force's fleet, including Sukhoi Su-30MKIs, Jaguars, and MiG-29s. This cross-service compatibility demonstrates India's intent to optimize its strike capabilities using a missile that can be deployed across a diverse range of aircraft, regardless of their Western or Russian origins. The missile's integration requires no significant modifications to avionics systems, making it a cost-effective and practical solution. For the MiG-29Ks, specific adaptations such as new bomb racks and wiring upgrades were implemented to ensure seamless deployment.

Strategically, the Rampage significantly extends the operational range of the MiG-29Ks, which operate primarily from the aircraft carriers INS Vikramaditya and INS Vikrant. The combination of these naval platforms and the precision strike capabilities of the missile enhances India's ability to deter adversaries while safeguarding its pilots and assets through long-range engagements. This development is particularly relevant in the context of growing

tensions in the Indian Ocean and South Asia, where India seeks to counter the influence of regional powers like China and Pakistan. For instance, the increasing presence of China's navy in the Indian Ocean, along with military infrastructure in neighboring countries, has prompted India to invest in advanced weapon systems like the Rampage.

The Rampage stands out not only for its range and precision but also for its operational versatility. Each aircraft can carry up to four missiles, enabling simultaneous strikes on multiple targets or concentrated salvos on a single objective. This capability provides a tactical advantage, especially in missions to neutralize air defense sites or destroy critical infrastructure. Furthermore, the missile's ability to function in electronic warfare conditions, thanks to its anti-jamming systems, enhances its reliability in contested environments.

India and Israel share a long history of defense cooperation, and the integration of the Rampage highlights the importance of these strategic partnerships. By acquiring advanced technologies from Israel, India not only modernizes its military capabilities but also diversifies its sources of defense procurement, reducing reliance on major global powers. The Rampage exemplifies this approach by combining proven Israeli technology with India's operational needs.

The integration of the Rampage missile into the Indian Navy's MiG-29Ks represents a major enhancement in India's precision strike capabilities. It underscores the country's commitment to staying at the forefront of military technology and its ability to address strategic challenges in an increasingly complex regional environment. By investing in systems like the Rampage, India demonstrates its resolve to safeguard its national interests while strengthening strategic alliances with key partners like Israel. This initiative, blending technological innovation and defense strategy, positions India as a critical player in regional security.

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China's Aerospace Force Reveals Long-Range Radar in Message to Xi Jinping

Hayley Wong | 30 Jan 2025

Source: SCMP | https://www.scmp.com/news/china/military/article/3296786/chinas-aerospace-force-reveals-long-range-radar-message-xi-jinping?module=top_story&pgtype=homepage

Rare close-up footage of China's strategic long-range radar has been aired in a state television report on President Xi Jinping's Lunar New Year message to the military.

A ground-based phased-array radar station, with "early warning and monitoring" troops standing in front of it, was seen in an end-of-year video sent to Xi by the People's Liberation Army on Friday.

It featured in a CCTV report Saturday, and while details of the system were not disclosed, analysts said the advanced radar in the footage was a key part of Beijing's efforts to improve its early warning capabilities against missile threats.

The PLA video sent to Xi featured representatives from across the military, including the army, navy, air force and aerospace force, which showed the radar system as part of its message to the president.

Close-up footage of the radar station aired on CCTV showed dozens of antennas lined up in an octagon array in a structure at least six storeys high.

Standing in front of the radar, an aerospace force representative said: "We will strictly monitor the battlefield situation to ensure that if there is any situation, we will respond immediately."

Xi was also shown in the report extending Lunar New Year greetings to the defence and security forces and urging troops to "strengthen combat readiness duties" in case of emergency during the festival.

Song Zhongping, a military commentator and former PLA instructor, said the structure seen in the footage appeared to be a "strategic, active phased-array radar" that could detect missile threats within "a few thousand kilometres".

He said it was "at the forefront" of the country's anti-missile defence system. "It is key to receiving warnings at an early stage, so that you have enough time to organise anti-missile forces to react [to missile threats]."

Song added that China would also be looking at using such a system to detect hypersonic missiles.

China, whose military power has rapidly expanded in recent years, sees long-range defence capabilities as the key to its national security and deterrence. The PLA conducted a rare test launch of an intercontinental ballistic missile last year – its first in decades.

The military has also launched new anti-ballistic systems like the surface-to-air HQ-19, which has been compared to the US Terminal High-Altitude Area Defence system, or THAAD.

While the PLA has not disclosed the number or any details of its long-range early warning radar systems, the Pentagon estimates that it has "several ground-based, large-phase array radars – similar in appearance to US PAVE PAWS radars – that could support a missile early warning role", according to its report last year on the development of the Chinese military.

The PAVE PAWS – or American Precision Acquisition Vehicle Entry Phased Array Warning System – was developed during the

Cold War and can detect a missile launched from as far away as 5,000km (3,100 miles). It can track projectiles in motion in great detail, even from a distance of 2,000km (1,200 miles). The system can also be used to detect submarine-launched ballistic missile attacks and conduct general space surveillance and satellite tracking.

Fu Qianshao, a military analyst and former equipment expert with the PLA, said while details of the Chinese system were not publicly available, it "should be slightly more powerful [in coverage] than the PAVE PAWS radar".

The South China Morning Post reported in 2022 that two large phased-array radars in the eastern province of Shandong had been used to monitor missile threats from North Korea, South Korea and Japan.

China started working on – and investing heavily in – phased-array radar systems in the 1970s as part of a military modernisation programme.

Phased-array radar has a higher scanning speed and better accuracy than traditional radars. Instead of physically moving an antenna, the array is controlled by computers to electronically scan in different directions.

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Air Power

HAL Clears Army and Air Force Versions of Dhruv Helicopter

02 May 2025

Source: IDRW | https://idrw.org/hal-clears-alh-dhruv-for-army-and-air-force-operations-following-defect-investigation/

In a significant development for India's defense aviation sector, Hindustan Aeronautics Limited (HAL) has announced that the Advanced Light Helicopter (ALH) Dhruv, in its Army and Air Force versions, has been cleared for operations. This follows a clarification issued on April 11, 2025, and is based on the recommendations of a Defect Investigation (DI) Committee. HAL has also outlined a time-bound plan for the resumption of operations, worked out in collaboration with the Indian Army and Air Force, signaling a resolution to concerns that had previously grounded the helicopter fleet

The ALH Dhruv, a multi-role helicopter developed by HAL, has been a cornerstone of India's indigenous defense manufacturing efforts since its first flight in 1992 and induction into service in 2002. Designed to operate in diverse environments-from high-altitude regions like Siachen to maritime roles-the Dhruv is used by the Indian Army, Air Force,

Navy, and Coast Guard, with over 300 units delivered as of early 2025. The helicopter has also been exported to countries like Ecuador, Mauritius, and Nepal, showcasing India's growing defense export capabilities.

However, the ALH Dhruv has faced scrutiny in recent years due to a series of accidents and technical issues. Between 2002 and 2023, the helicopter was involved in several crashes, with notable incidents including a 2021 crash in Jammu and Kashmir that killed two Army pilots and a 2023 Navy ALH accident off the Kochi coast. These incidents, attributed to design flaws, maintenance issues, and human error, led to temporary grounding of the fleet multiple times, in March 2023, the Ministry of Defence ordered a comprehensive safety review following a Navy ALH crash, and in May 2023, the Comptroller and Auditor General (CAG) highlighted design and quality control issues in a report, noting 12 accidents involving the Dhruv between 2017 and 2022

The most recent grounding occurred in early 2025, prompted by a fresh wave of concerns over structural integrity and rotor blade issues in the Army and Air Force variants. This led HAL to convene a Defect investigation Committee to thoroughly assess the helicopter's safety and operational readiness

In its latest statement, HAL confirmed that the DI Committee has completed its investigation, addressing the concerns that led to the grounding. "In furtherance to the clarification dated 11th April 2025, it is now intimated that the Advanced Light Helicopter (ALH) Dhruv Army and Air Force versions are cleared for operations based on the Defect Investigation Committee recommendations," HAL stated. The company added that a time-bound plan for the resumption of operations has been developed in consultation with the Indian Army and Air Force, ensuring a phased and systematic return to service.

While specific details of the committee's findings were not disclosed, sources indicate that the investigation focused on addressing issues related to the helicopter's main rotor blades, control systems, and structural components-areas flagged in previous accidents. HAL is believed to have implemented corrective measures, including design modifications, enhanced quality control, and revised maintenance protocols, to mitigate risks.

The clearance is a significant step forward for the ALH program, which has been a point of pride for India's defense industry but also a source of contention due to its troubled safety record. The Army and Air Force, which rely on the Dhruv for critical roles such as troop transport, reconnaissance, and search-and-rescue missions, can now resume operations with renewed confidence in the platform's reliability.

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In First, British Army Uses Radio-Wave Weapon to Knock Out Drone Swarm

Rudy Ruitenberg | 17 April 2025

Source: Defense News | https://www.defensenews.com/global/europe/2025/04/17/in-first-british-army-uses-radio-wave-weapon-to-knock-out-drone-swarm/

Militaries worldwide are fielding new systems for enhancing their own drone swarm tactics while also trying to intercept adversary formations. (Saab)

PARIS — The British Army successfully tested a radio-wave weapon to knock out drone swarms, as militaries look for new ways to neutralize what has become one of the biggest threats on the modern battlefield.

The Army was able to defeat drone swarms for the first time in the latest trial of the weapon-system demonstrator, the Ministry of Defence said in a statement on Thursday. The weapon, developed by a consortium led by Thales UK, uses high-frequency radio waves to fry drone internals, disrupting or damaging critical electronic components and causing the drones to crash or malfunction.

Soldiers from 106 Regiment Royal Artillery took down two swarms of drones in a single engagement using the weapon, and more than 100 drones were immobilized across all trials, the MoD said. The radio-frequency, directed-energy weapon was capable of neutralizing multiple drone targets simultaneously with near-instant effect, it said.

The U.K. has invested more than £40 million (US$53 million) into research and development of the radio-wave weapons to date, it said. With an estimated cost of 10 pence per shot fired, "if developed into operational service it could provide a cost-effective complement to traditional missile-based air defense systems," the government said.

Radio-frequency directed energy weapon systems can defeat airborne targets at ranges of up to 1 kilometer (0.62 mile), and are effective against targets that can't be jammed using electronic warfare, according to the government.

Such systems could help protect security-sensitive areas such as defense bases from unidentified drones, as well as play a role in preventing disruption at airports, the government said. Drone sightings have caused airport shutdowns around the world in recent years.

The demonstrator weapon was quick to learn and easy to use, according to testimony from Sgt. Mayers, a senior remotely-piloted air systems operator from 106 Regiment Royal Artillery, who made history as the first British soldier to bring down drones using a radio-frequency weapon.

The trail was conducted at Air Defence Range Manorbier, a live-firing range in south-

west Wales. The purpose of the project is to develop a weapon that allows the Army to test the integration challenges and operational challenges of fielding a radio-frequency, directed-energy weapon system, or RF DEW, the government said.

Thales have around 100 engineering and manufacturing staff in Northern Ireland working on the project, with another 30 to 35 supply chain jobs in Essex in east England, according to the MoD.

"Thales continues to be at the forefront of this pioneering technology, and we are proud to continue the research and development in this sector alongside our partners in government," said Nigel MacVean, managing director of Thales Integrated Airspace-protection Systems.

The MoD said it's working with a range of industry partners to provide U.K. forces with future RF DEW capabilities.

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China Rushes PL-15 Missiles to Pakistan Amid India Tensions

Boyko Nikolov | 26 April 2025

Source: Bulgarian Military | https://bulgarianmmilitary.com/2025/04/26/china-rushes-pl-15-missiles-to-pakistan-amid-india-tensions/

Photo credit: X

In a region where the delicate balance of power is shaped by nuclear arsenals and cutting-edge air forces, a single delivery of advanced weaponry can tip the scales.

- Saudi Arabia's F-35 hopes fade despite massive US arms package
- S-300PS deployment in Kyrgyzstan signals Russian power play
- GOP plans THAAD boost for Trump's Golden Dome defense shield

This week, reports surfaced on social media platform X, specifically from an account known as The STRATCOM Bureau, claiming that China has executed an urgent delivery of PL-15 very long-range air-to-air missiles to Pakistan for its JF-17 fighter jets.

The alleged transfer said to have occurred in response to escalating tensions between Pakistan and India, underscores China's

growing role as a swift and strategic ally in South Asia. While the claims remain unverified by official sources, they point to a broader pattern of Beijing's ability to bolster its partners with critical military resources at pivotal moments. This capability could reshape regional dynamics and challenge global powers.

The STRATCOM Bureau's post on X, which included a photograph purportedly showing a Pakistani JF-17 armed with the PL-15 missile, described the delivery as a rapid response to heightened regional friction. According to the account, the missiles were drawn from the internal stocks of China's People's Liberation Army Air Force, rather than the export-variant PL-15E, suggesting a transfer of high-capability weaponry typically reserved for China's own forces.

The post praised China as a "gold standard" ally, highlighting the speed and strategic weight of the move. While such claims from social media demand cautious scrutiny, they align with China's broader strategy of leveraging its military-industrial complex to support allies like Pakistan, particularly in moments of crisis.

China's ability to deliver advanced weaponry with such apparent speed reflects a sophisticated logistical and industrial framework that few nations can match. Unlike traditional arms exports, which often involve lengthy negotiations and production timelines, this reported delivery suggests a pre-existing coordination between Beijing and Islamabad, enabling near-instantaneous support.

For context, the United States demonstrated similar agility during the early stages of the Russia-Ukraine conflict in 2022, when it rushed Javelin anti-tank missiles to Kyiv within days of requests. China's actions, however, are less visible in Western discourse, yet no less significant.

Beijing's defense industry, bolstered by state-backed conglomerates like the Aviation Industry Corporation of China, has scaled up production and streamlined supply chains, allowing it to respond to allies' needs with remarkable efficiency. This capability positions China as a formidable player in global arms dynamics, challenging the dominance of traditional suppliers like the U.S. and Russia.

The PL-15 missile at the heart of this reported delivery is a cornerstone of modern air combat, designed to engage targets at extreme distances. Developed by China's Luoyang-based China Airborne Missile Academy, the PL-15 is an active radar-guided missile with an estimated range of 120 to 190 miles, powered by a dual-pulse solid-propellant rocket motor.

Its active electronically scanned array radar seeker, coupled with a two-way datalink, allows for precise targeting and mid-course corrections, making it a versatile weapon against agile fighters, bombers, and high-value assets like airborne early warning and control aircraft.

The missile's cropped fins enable it to fit within the internal weapons bays of stealth fighters like China's J-20, and its integration with the JF-17 Block III, equipped with the

advanced KLJ-7A AESA radar, enhances Pakistan's ability to conduct long-range engagements.

The PL-15's range and maneuverability are said to rival or surpass Western equivalents like the U.S. AIM-120D AMRAAM, which has a range of approximately 100 miles and are comparable to the European MBDA Meteor, known for its ramjet propulsion and large no-escape zone.

For Pakistan, the integration of the PL-15 into its JF-17 fleet represents a significant leap in air combat capability. The JF-17 Thunder, a lightweight, single-engine multirole fighter jointly developed by Pakistan's Aeronautical Complex and China's Chengdu Aircraft Corporation, is a mainstay of the Pakistan Air Force, with over 130 units in service.

The Block III variant, introduced in 2020, features advanced avionics, a three-axis fly-by-wire system, and the aforementioned KLJ-7A radar, which can track 15 targets simultaneously and engage four. Armed with the PL-15, the JF-17 can now threaten high-value Indian assets, such as AWACS platforms or refueling tankers, from standoff distances, forcing India to rethink its air defense strategies.

This capability is particularly critical in the context of South Asia, where air superiority often determines the outcome of skirmishes along the contested Line of Control in Kashmir.

To understand the strategic implications, it's worth comparing the PL-15 to India's air-to-air missile arsenal. India's primary beyond-visual-range missile, the Astra Mk-1, has a range of approximately 68 miles, significantly shorter than the PL-15.

The Astra Mk-2, currently under development, aims to extend this to 100 miles, but it is not yet operational. India also fields the MBDA Meteor on its Rafale jets, a missile with a range of around 120 miles, and a reputation for its large no-escape zone due to its ramjet engine.

While the Meteor remains a formidable weapon, the PL-15's longer range offers Pakistan a potential edge in engaging targets before Indian jets can respond. If the STRATCOM Bureau's claim about non-export PL-15s is accurate, Pakistan may have received missiles with capabilities exceeding the PL-15E's reported 90-mile range, further tilting the balance.

This development could compel India to accelerate its missile programs or seek additional foreign acquisitions, such as Russia's R-37M, which boasts a range of up to 250 miles.

The reported delivery comes against the backdrop of renewed tensions between India and Pakistan, centered on the disputed region of Kashmir. A recent attack on tourists in Kashmir, which claimed 26 lives according to Bulgarian outlet Fakti.bg, has reignited hostilities. India responded by canceling visas for Pakistani nationals and expelling diplomats, while Pakistan retaliated by closing its airspace to Indian airlines and halting bilateral trade.

These measures echo past flare-ups, such as the 2019 Balakot crisis, when Indian airstrikes on alleged terrorist camps in Pakistan led to a brief but intense air skirmish. During that incident, a Pakistani JF-17 reportedly used an older PL-12 missile to down an Indian MiG-21, though India disputed the claim, citing evidence of U.S.-made AIM-120 missiles fired by Pakistani F-16s.

The current escalation, while not yet at the level of open conflict, has raised fears of further military posturing, with both nations maintaining robust air forces equipped for rapid response.

Historically, the India-Pakistan rivalry has been a driver of arms races in South Asia, with both nations seeking technological parity. Pakistan's reliance on Chinese weaponry, including the JF-17 and now the PL-15, mirrors India's diversification of suppliers, from Russia's Su-30MKI fighters to France's Rafale jets.

China's role as Pakistan's primary arms supplier dates back decades, with the JF-17 program itself a product of this partnership. Since its first flight in 2003, the JF-17 has evolved from a modest replacement for aging Mirage III and F-7 jets to a capable platform for modern warfare.

Its affordability, with unit costs of around $32 million for the Block III, contrasts with the $80 million-plus price tag of India's Rafale, making it an attractive option for Pakistan's budget-conscious military. The PL-15's integration further enhances this cost-effectiveness, providing near-elite capabilities at a fraction of the cost.

China's motivations for this reported delivery extend beyond its alliance with Pakistan. Beijing has its own tensions with India, particularly along the Line of Actual Control in the Himalayas, where border clashes in 2020 and 2022 underscored ongoing disputes.

By equipping Pakistan with advanced weaponry, China indirectly pressures India on a second front, diverting New Delhi's resources and attention. This aligns with China's broader strategy of countering India's growing influence in the Indo-Pacific, where New Delhi has strengthened ties with the U.S., Japan, and Australia through frameworks like the Quad.

The PL-15 delivery, if confirmed, serves as a reminder of China's ability to shape regional security dynamics, not through direct confrontation but through strategic support for allies.

The global implications of China's actions are significant. The U.S., which has long dominated the arms export market, faces increasing competition from China, whose weapons are often cheaper and come with fewer political strings.

The PL-15's development has already spurred U.S. efforts to counter it, with the AIM-260 Joint Advanced Tactical Missile program launched in 2017 to replace the AIM-120 AMRAAM. Expected to enter service in the mid-2020s, the AIM-260 aims to match or exceed

the PL-15's range and performance, reflecting the ripple effects of China's advancements.

Similarly, Russia, another major arms supplier, has seen its influence wane as China captures markets in Asia and Africa, with countries like Nigeria and Myanmar also operating JF-17s equipped with Chinese missiles.

Operationally, the PL-15 enhances Pakistan's ability to conduct air denial missions, potentially disrupting India's air operations in a conflict. By targeting high-value assets from long range, Pakistan could force India to operate its AWACS and tankers further from the front lines, reducing their effectiveness.

This shift could alter the tactical calculus in Kashmir, where air superiority is critical for rapid response to cross-border incidents. However, the PL-15's impact depends on Pakistan's ability to integrate it effectively, requiring robust training and maintenance infrastructure.

Past reports have highlighted challenges with the JF-17 fleet, including engine reliability issues with the Russian RD-93 turbofan, though Pakistan has since secured direct supplies from Russia to address these concerns.

The STRATCOM Bureau's claim that this is the first public evidence of the PL-15 on a JF-17 adds intrigue but also uncertainty. Social media platforms like X are valuable for real-time insights but prone to exaggeration or misinformation. Without official confirmation from Pakistan or China, the delivery's scale and timing remain speculative.

Nonetheless, the photograph shared on X, showing a JF-17 with what appears to be a PL-15, has sparked discussion among defense analysts, who note the missile's distinctive cropped fins and elongated fuselage.

If authentic, the image marks a milestone in Pakistan's air force modernization, building on its participation in multinational exercises like Victory Spear 2025 in Saudi Arabia, where the JF-17 Block III showcased its capabilities alongside Western jets like the F-15 and Rafale.

Looking ahead, the reported delivery raises questions about the trajectory of South Asian security. Will China continue to use rapid arms transfers to bolster allies in contested regions, from Pakistan to Myanmar? How will India respond, given its reliance on a mix of indigenous, Russian, and Western systems?

The Astra Mk-2 and potential acquisitions like the R-37M could restore parity, but development timelines and budgetary constraints may delay these efforts. Moreover, the risk of escalation looms large. Pakistan's enhanced capabilities could embolden it in future standoffs, while India's countermeasures could further intensify the arms race.

The absence of official confirmation about the PL-15 delivery underscores the challenges of navigating open-source intelligence, where unverified claims can shape perceptions as much as facts.

In a world where air power increasingly

defines military dominance, China's reported delivery of PL-15 missiles to Pakistan is a stark reminder of its growing influence. By equipping its ally with a weapon that rivals the best in Western arsenals, Beijing is not just supporting Pakistan but signaling its ambition to reshape global security dynamics.

For the U.S. and its allies, this development highlights the need to adapt to a multipolar arms market, where speed, affordability, and strategic alignment are as critical as technological superiority.

Yet, as the dust settles over Kashmir and the skies above, one question lingers: in a region defined by mistrust and rivalry, can such advancements foster stability, or do they merely set the stage for the next crisis?

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US Sanctions 19 Pakistani Firms Over 'Unsafeguarded' Nuclear, Ballistic Missile Program Activities

Ismail Dilawar | 08 April 2025

Source: Arab News | https://www.arabnews.com/node/2596287/pakistan

Pakistani military personnel stand beside the short-range Surface to Surface Missile NASR during the Pakistan Day military parade in Islamabad on March 23, 2018. (AFP/File)

KARACHI: The Bureau of Industry and Security of the United States (US) Department of Commerce has added more than a dozen Pakistani firms to its entity list for their contributions to "unsafeguarded" nuclear activities and seven others for contributing to the South Asian nation's ballistic missile program.

Late last month, the US authorities changed their Export Administration Regulations (EAR) and added 70 entities from China, Pakistan, Iran, South Africa and the United Arab Emirates to the list that identifies entities which have been involved or pose a significant risk to national security or foreign policy interests of the US, according to the US federal register website.

Pakistani companies that have been restricted for their alleged involvement in

unsafeguarded nuclear activities include Britlite Engineering Company, Indentech International, IntraLink Incorporated, Proc-Master, Rehman Engineering and Services, The Sadidians, Sine Technologies, Supply Source Co., Ariston Trade Links, Professional Systems (Pvt) Ltd., RASTEK Technologies and NA Enterprises.

"These entities have been determined by the US Government to be acting contrary to the national security or foreign policy interests of the United States," the US federal register website said.

"[The EAR impose] additional license requirements on, and limit the availability of, most license exceptions for exports, re-exports, and [in-country] transfers when a listed entity is a party to the transaction."

Pakistani firms put under additional restrictions for allegedly contributing to Pakistan's ballistic missile program include Allied Business Concerns (Pvt) Ltd, Global Traders, Linkers Automation (Pvt) Ltd, Otto Manufacturing, Potohar Industrial & Trading Concern, Rachna Supplies (Pvt) Ltd. and Resource Enterprises.

Most of the above-mentioned companies are based in Islamabad, Karachi, Lahore, Faisalabad and Wah Cantonment, but they could not be immediately reached for comments.

Pakistan's foreign ministry said last month the US "unfairly targeted" Pakistan's commercial entities without any evidence whatsoever.

"Such biased and politically motivated actions are counterproductive to the objectives of global export controls and obstruct the legitimate access to technology for socio-economic development," Shafqat Ali Khan, a foreign ministry spokesperson, said during a weekly media briefing in Islamabad on March 27.

Pakistan's relations with the US, its largest export destination, have mostly been patchy since Washington's withdrawal from Afghanistan in August 2021.

Last week, President Donald Trump's administration imposed a 29 percent reciprocal tariffs on imports from Pakistan, which analysts believe may hurt the South Asian nation's textiles industry that fetched $17 billion for the cash-strapped country in the last fiscal year that ended in June.

Pakistan, which enjoys a trade surplus with the US, plans to send a high-level delegation to Washington for discussions on the new tariffs that Finance Minister Muhammad Aurangzeb has said could be turned into an opportunity for the benefit of the two trading partners.

In December, the US government also sanctioned Pakistan's National Development Complex and three Karachi-based commercial entities, including Akhtar and Sons Private Limited, Affiliates International and Rockside Enterprise.

Pakistan's foreign ministry called the

sanctions as "unfortunate and biased" and said the country's strategic capabilities are meant to defend its sovereignty and preserve peace and stability in South Asia.

Regretting the sanctioning of private commercial entities, the ministry said similar listings of commercial entities in the past were based on mere doubts and suspicion without any evidence.

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US Navy Loses $60 Million Jet at Sea After it Fell Overboard from Aircraft Carrier

Haley Britzky, Natasha Bertrand and Brad Lendon | 29 April 2025

Source: CNN | https://edition.cnn.com/2025/04/28/politics/us-navy-jet-overboard/index.html

This April 1 photo from the US Navy shows a F/A-18E Super Hornet preparing for launch on the USS Harry S. Truman. US Navy

CNN — A US Navy F/A-18 Super Hornet fighter jet has been lost at sea after it fell overboard from the USS Harry S. Truman aircraft carrier while it was being towed on board, the Navy said in a statement on Monday.

A US official said initial reports from the scene indicated the Truman made a hard turn to evade Houthi fire, which contributed to the fighter jet falling overboard. Yemen's Houthi rebels claimed on Monday to have launched a drone and missile attack on the aircraft carrier, which is in the Red Sea as part of the US military's major operation against the Iran-backed group.

All personnel aboard are accounted for, and one sailor sustained a minor injury, the Navy said. The injured sailor was in the cockpit of the jet at the time, as is typical when moving a jet in the hangar bay, a second US official told CNN. The sailor jumped out of the jet before it went overboard.

"The F/A-18E was actively under tow in the hangar bay when the move crew lost control of the aircraft. The aircraft and tow tractor were lost overboard," the statement said. "Sailors towing the aircraft took immediate action to move clear of the aircraft before it fell overboard. An investigation is underway."

A third US official told CNN that the aircraft had sunk. An individual F/A-18 fighter jet costs more than $60 million, according to the Navy.

US Navy carriers – the world's largest warships at nearly 1,100 feet long and with a displacement of almost 100,000 tons – are surprisingly maneuverable for their size.

Powered by two nuclear reactors driving four propeller shafts, Nimitz-class carriers like the Truman can reach speeds in excess of 34

mph.

The exact details of the turn the Truman made to avoid the Houthi fire have not been released, but photos and videos of the ship and other Nimitz-class carriers on the Defense Department's website show the massive vessels can take on a substantial list in a high-speed turn.

Carl Schuster, a former US Navy captain, told CNN that carriers trying to avoid a missile attack use a "zig-zag" tactic.

"You typically do a series of alternating 30- to 40-degree turns. Each takes about 30 seconds each way, but the turn starts sharply. It is like riding in a zig-zagging car," Schuster said.

"The ship leans about 10 to 15 degrees into the turn, but it displaces the ship about 100 to 200 yards from any likely aim point" if the ship is moving at maximum speed, he said.

Repeated Atacks

The Truman Carrier Strike Group is deployed in the Middle East and was in the Red Sea at the time of the incident. The Navy emphasized on Monday that the strike group and its air wing "remain fully mission capable."

The Truman has repeatedly been targeted in attacks by the Houthis. It made headlines in February when it collided with a merchant ship near Egypt; no injuries were reported. Another F/A-18 from the Truman was also "mistakenly fired" upon and shot down by the cruiser USS Gettysburg in the Red Sea in December; both pilots ejected safely.

Other US Navy ships in the region have also come under Houthi fire. In early 2024, a US destroyer in the Red Sea had to use its Phalanx Close-In Weapon System, its last line of defense to missile attacks, when a Houthi-fired cruise missile got as near as a mile away – and therefore seconds from impact.

The Houthi targeting of US warships in the region began after the US Navy stepped in to try to prevent the rebel group from hitting commercial ships heading for Israel in protest of its invasion of Gaza in October 2023.

In recent weeks, the Trump administration has stepped up airstrikes on Houthi targets in Yemen, prompting retaliatory threats against US warships by the rebel group.

"Yemen will not back down from continuing its support operations for the Palestinian people until the Israeli aggression on Gaza stops and the siege is lifted," the Houthi-controlled armed forces in Yemen said in a statement earlier this month after US airstrikes on an oil port in western Yemen killed dozens of people.

The militant group said the US' "aggression" against Yemen would "only lead to further targeting, engagement, and confrontation."

The Houthis on Monday alleged a US airstrike hit a prison holding African migrants, killing dozens of people. The US military made no immediate comment.

Air Force Piloting Hydrogen Energy Tech for Agile Combat Logistics

Shaun Waterman | 15 April 2025

Source: Air and Space Forces | https://www.airandspaceforces.com/hydrogen-energy-tech-agile-combat-logistics/#:~:text=Hickam%20Air%20Force%20Base%20in,Combat%20Employment%20way%20of%20warfare

The HyTEC hydrogen fuel generator was demonstrated in April 2025 at POST FX at Marine Corps Base Hawaii. Courtesy Novaspark Energy Corp.

Novel energy technology backed by the Air Force innovation arm AFWERX could provide electrical power and hydrogen fuel in the kind of isolated and austere outposts the Air Force will need in the Pacific theater for its new Agile Combat Employment way of warfare.

The technology, being piloted at Marine Corps Base Hawaii, was developed by a majority veteran-founded startup based in Houston. It employs wind and solar power to use electrolysis to make hydrogen from water in the atmosphere. The compressed hydrogen can then be converted into electric power via a hydrogen fuel cell, or used to fuel drones powered by the same kind of high-tech fuel cell. Any of the water extracted that remains can be used for drinking.

But what really caught the eye of the military, explained Rick Harlow, CEO of NovaSpark Energy Corp., was the form factor. He recently returned from Hawaii, where Novaspark demonstrated their Hydrogen at the Tactical Edge of Contested logistics (HyTEC) unit for INDOPACOM and at the 2025 Pacific Operational Science & Technology conference Field Experimentation event, called POST FX.

HyTEC is a portable unit, smaller than two porta-potties, which can be airdropped on a parachute, towed by a Joint Light Tactical Vehicle (JLTV), and takes less than 30 minutes to set up. “The Marines told us, ‘we need to be able to move up to five times a day, because we don’t want to be a sitting target,’” Harlow told Air & Space Forces Magazine. For the Air Force, being able to airdrop the units means rapid deployment to isolated environments—as envisaged by Agile Combat Employment.

Above all, by providing a source of power almost literally out of thin air, said Harlow, HyTEC can help eliminate dependance on a long logistics tail for fuel resupply in the vast, ocean-spanning, Pacific theatre.

When it comes to air transportation, space is always at a premium. And the biggest consumers of space are often fuel and water, Air Force officials say, both of which can be provided by the HyTEC unit, which generates about 4.5 pounds of compressed hydrogen every 24 hours.

“You don’t have to fly diesel [or other fuels]

around where it could cost as much as $400 to $500 a gallon by the time it's delivered," Harlow said.

HyTEC is accessorized with portable briefcase-sized hydrogen fuel cells that can output 4 kilowatts of electricity to power satellite terminals or other communications and IT equipment in the field.

As an alternative to diesel or gasoline generators, the HyTEC/fuel cell system has heat and noise signatures that are both much lower, said Novaspark Chief Innovation Officer Lanson Jones.

"The sound from the HyTEC unit is a slight hum. Less than 30 decibels. More quiet than a dishwasher, and there's really no heat signature," he said. More importantly, unlike a diesel generator, it can run 24/7 for long periods of time.

"I call it the Swiss Army knife," Jones said of the HyTEC, "because not only can you create hydrogen to fuel drones, or make electricity, but you can also use the compression equipment to refill tires, and, if the hydrogen tank is full and you want to keep it, you can tap directly into the power from the wind turbine and from the solar panels without using that hydrogen. And you can do other really cool stuff, like make water for the troops."

The hydrogen HyTEC produces can be used to fuel a new generation of drones like Lockheed Martin's Stalker, and ground vehicles being developed by the U.S. Army, added Harlow.

"With hydrogen, you can not only go further than batteries, but you can actually go further than with diesel" or other fuels, said Harlow.

"So in practical terms with the drones, you're looking at going two to three times as far and carrying two to three times the payload compared to batteries. There's a huge strategic advantage," he said.

The HyTEC system was first developed with funding from the Defense Innovation Unit, Harlow explained.

"We won a contract with the DIU, and they funded us to build the unit and to prove out that it works. So we were able to use non-dilutive funding without having to give away a bunch of the company in the process of getting investment."

They then won an AFWERX Commercial Solutions Offering contract, which was recently extended, Harlow said, as well as an Other Transaction Authority contract from the Army Contracting Command in Picatinny, N.J.

"Any military agency or element can buy off that contract, and so can the different National Guards in the various states."

The National Guard's ability to buy off that contract is significant, Harlow said, because the company is looking to expand into the disaster relief sector, where the Guard is very active.

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HAL's New HLFT-42 Promise to Serve as Both a Modern Trainer and a Light Combat Fighter, Eyes Global Market with Potential $20M Price Tag

Jaydeep Gupta | 30 January 2025

Source: Defence.in | https://defence.in/threads/hals-new-hlft-42-promise-to-serve-as-both-a-modern-trainer-and-a-light-combat-fighter-eyes-global-market-with-potential-20m-price-tag.12607/

Hindustan Aeronautics Limited (HAL) is set to unveil its latest offering in the aerospace domain: the Hindustan Lead-in Fighter Trainer (HLFT-42). This new aircraft is designed to bridge the gap between advanced training and light combat capabilities, making it a versatile asset for modern air forces.

The HLFT-42 boasts advanced features such as an Active Electronically Scanned Array (AESA) radar, enabling it to track and engage multiple targets simultaneously. This, coupled with its ability to carry a range of weapons, makes the HLFT-42 a potent platform for light combat operations.

HAL has emphasized the aircraft's adaptability, highlighting its potential for customization to meet the specific needs of individual clients. This flexibility extends to its scalability, interoperability, and configurability, making it an attractive option for a wide range of international buyers.

While HAL has not yet released official pricing details, industry sources suggest that the base model of the HLFT-42 could be priced around $20 million USD. This competitive pricing strategy, combined with the aircraft's adaptability and advanced capabilities, is expected to make it a strong contender in the global defence market. It's important to note that the final cost of an HLFT-42 may vary depending on the specific configuration and features requested by the purchasing nation.

The HLFT-42 is poised to become a key player in the international fighter trainer market, offering a cost-effective solution without compromising on advanced capabilities. With its dual role as both a trainer and a light combat aircraft, the HLFT-42 represents a significant step forward in aerospace technology.

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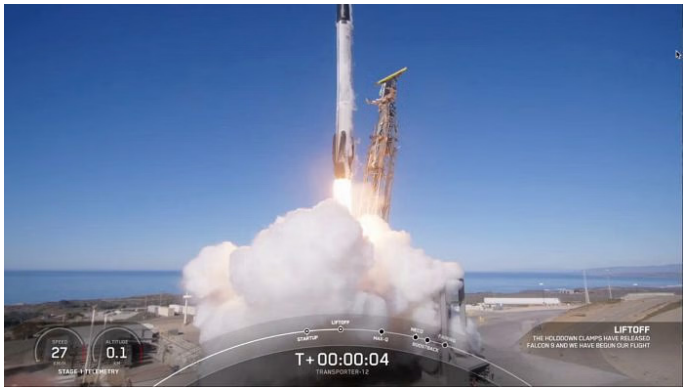
Space

Digantara, Pixxel are Inspired by Elon Musk. This will Drive India Inc. Space Dreams

Anisha Reddy | 30 January 2025

Source: The Print | https://theprint.in/ground-reports/digantara-pixxel-are-inspired-by-elon-musk-this-will-drive-india-inc-space-dreams/2468683/



Pixxel's hyperspectral imaging satellites being launched aboard a SpaceX rocket from Vandenberg Space Force Base, California, USA | Credit: Pixxel

Bengaluru: As college students, Awais Ahmed and Anirudh Sharma dreamt of meeting Elon Musk. Years later, they launched their homegrown satellites in a SpaceX rocket.

On 14 January, two Bengaluru startups—Pixxel, co-founded by Ahmed, and Digantara co-founded by Sharma–saw their satellites soar into space from Vandenberg Space Force Base, California, US.

It was a groundbreaking first for both startups. Pixxel became the first private company in India to have its own constellation of satellites using a cutting-edge hyper-spectral frequency that allows observation of the Earth in over 150 bands. It's a technology useful in sectors as diverse as agriculture and defence.

"When I first saw the visuals of Elon Musk's satellites being integrated at the Space X facility back in 2017, I knew we had the same passion and determination to do something that has never been done before in space. That was the start," said Ahmed, who founded Pixxel with Kshitij Khandelwal.

Digantara Aerospace launched the world's first commercial satellite – Space Camera for Object Tracking (SCOT) – for surveillance of debris as small as 5 cm orbiting the Earth to ensure safer space operations.

The launch of both satellites is a giant leap for India, which has only just begun to carve out its space in the $630 billion global space sector. In contrast, the Indian space economy is valued at $8.4 billion, and holds only a 2 per cent share of the global commercial space market.

But this narrative is set to change with the Indian government opening up the space sector to private players in 2020. It has resulted in an explosion of startups.

"Within a few years, we have over 200 startups in the country operating at different parts of the space sector value chain and doing amazing things," said Ashwin Prasad, a research analyst at New Delhi's Takshashila Institution, which undertakes research on space economics.

With the rapid rise of space tech startups

like Pixxel and Digantare, the Indian space economy could reach a valuation of $100 billion by 2040, according to a report by a global management consulting firm.

"To develop any strategic technological capability, a country has to create and tap into a robust industrial ecosystem. Only such private-driven ecosystems can draw on the talent, resources and infrastructure in the most efficient way to maximise the potential for innovation. This is the thinking that has driven the recent growth of startups in the Indian space sector too," Prasad added.

Hyperspectral Imaging

Over 200 employees gathered at Pixxel's three-storey headquarters in Bengaluru's Hennur Bellary Road Layout on 14 January. The lift-off was live-streamed from California and they joined in the countdown. When their three satellites–called Fireflies—roared into space, cheers erupted across their office.

"Although the idea first sprouted in 2019, it took us the last 18-24 months to actually build these satellites," said Ahmed. His favourite catchphrase to describe what his Fireflies do: "They're like an MRI for the earth."

A phone camera cannot be used to scan a human body for internal bleeding. You need an MRI scan to detect the problem, he explained.

Fireflies do exactly that, but in space. The satellites scan the planet and help detect pollution levels, gas leaks, and even crop diseases that otherwise are invisible to the naked eye or standard cameras. They do this using a technology called hyperspectral imaging.

"We found that a lot of the time, it is difficult to identify the exact disease affecting a crop or point out where exactly a gas leak was happening or could happen in the future. Our satellites aim to provide timely insights about such problems in sectors like agriculture, mining, environment, and energy," said Ahmed.

The Pixxel founders met in BITS Pilani, Rajasthan, while completing their Masters in Mathematics. They were part of the student satellite team on campus called Anant, and collaborated with ISRO scientists on multiple satellite projects.

During their second year of college, Ahmed and Khandelwal competed in SpaceX's Hyperloop Pod competition competing with teams from all over the world. It allowed them to build a hyperloop pod that could travel in a one-mile-long vacuum tube. Ahmed and Khandelwal became one of the 20 finalists from 2,500 global teams.

Buoyed by their success, they zeroed in on the idea of building a startup that would develop satellites with hyperspectral imaging in 2019. Today, Pixxel is backed by Google and was lauded by Prime Minister Modi on Mann Ki Baat when they sent Firefly to space.

Ahmed gave the example of the 55 'methane bombs' worldwide. These are fossil fuel extraction sites where future gas leaks could release methane equivalent to 30 years'

worth of all US greenhouse gas emissions. Once the satellites are stationed in space, they will be able to identify such sites, monitor the emissions in real-time, and detect when a gas leak could occur.

The company started with a team of just four people – two co-founders and two engineers. After the initial help with funding from BITS alumni, the team has grown to 225 employees today. So far, the company has signed around 65 clients including Rio Tinto, British Petroleum, and India's Ministry of Agriculture, with some already paying for data from its demo satellites that were launched early last year. The startup plans to add 18 more satellites to the six it has already developed.

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India's Military Space Doctrine

08 April 2025

Source: India Strategic | https://www.indiastrategic.in/indias-military-space-doctrine/

Bengaluru. India is poised to formally establish its military presence in space with the imminent release of a dedicated Military Space Doctrine and National Space Policy within the next two to three months.

The announcement, made by Chief of Defence Staff Anil Chauhan, represents a significant milestone in India's evolving space strategy and comes amid increasing focus on defence-space collaboration across multiple fronts.

The Chief of Defence Staff emphasised the space sector reforms undertaken by the country in recent years, and the works of Defence Space Agency, the key agency for developing capabilities that protect India's interests in outer space and deal with threats of space wars.

The CDS also said that humanity is on the "cusp of an era" where space is emerging as a new domain of warfare, and pitched for developing a "space culture" that entails

developing doctrines, conducting research and establishing dedicated warfare schools.

"The Defence Space Agency is working on bringing out a military space doctrine, which hopefully should be out in two or three months. We are also working on a national military space policy," the CDS told a gathering of defence and space experts.

CDS Chauhan also mentioned the government's approval of a 52-satellite constellation for the defence sector, of which 31 satellites will be built by the private sector.

"We are going to launch 52-odd satellites for intelligence, surveillance and reconnaissance purposes, in partnership with the Indian Space Research Organisation (ISRO) and private sector," he said.

The Defence Space Agency is working on an integrated satellite communication grid to mitigate the current limitations and "prepare ourselves for future", the CDS said.

He underlined that military space operations are critical for identifying potential threats to national security. These threats may originate from state or non-state actors, and the vulnerabilities may extend beyond the space-based system.

"The capabilities of some of our adversaries are growing by leaps and bounds. They have created a special aerospace force, and have demonstrated on-orbit manoeuvres. It is important that we keep track of these because they form part of a risk-mitigation strategy," the CDS said.

He asserted that as Indians and "as a culture that respects space through knowledge and research, we need to reposition ourselves."

Underlining how military ethos evolved over the centuries with the evolution of maritime and aerospace warfares, the CDS said that in the past, a seafaring culture may have allowed the Portuguese, the Spaniard, the English or the Dutch to dominate the world.

Similarly, the aerospace culture led to the domination of the US and European nations.

He said during the era of maritime warfare, maritime capabilities could decide the outcome of a battle in the sea or have a major influence on the battle on the land.

Similarly when air power becomes a major instrument of fighting war, it could decide a battle in the air space or have a large effect on the battle on land or the sea.

"So, when we say that space is going to form the basic building blocks of warfare in future, it is going to have an impact on all these three domains," Chauhan said.

"Hence, it is important to develop space capabilities. And before we develop these capabilities, it is important to create the 'space culture', or the culture of talking about space," he said.

The CDS underlined that space culture is about "new ideas on the use of space".

Expounding his views of the space culture, the CDS said, "It is about doing seminal research on warfare. It is about the development of doctrines and strategies about space. It is also about development of subjects like space laws, or a framework for space diplomacy."

The CDS said that while scope for developing the space culture is vast, there is very less literature on it currently.

"Building a space culture is not about creating new start-ups on space. It is also about space journals, articles, space warfare institutes and societies that ideate on it," he said, adding, "I think there is an important need that Services also have their own space warfare schools in the near future."

The Space-based assets will become "what we call in military terms, the new centres of gravity".

He emphasised that militarisation of space is not a futuristic concept and is a "threat of weaponisation".

"It is not a matter of if, but when," he said.

The growing arms race in space is going to become a "strategic imperative" and this is something India should not lose sight of, he added.

Emerging Military Space Framework

The Defence Space Agency is actively formulating India's first comprehensive Military Space Doctrine alongside a National Space Policy, as announced by CDS Anil Chauhan.

This development builds upon India's existing space security framework, which began taking formal shape with earlier doctrines that emphasised deterrence capabilities.

The 2021 space doctrine from the Takshashila Institution had already established that "India will pursue a doctrine anchored in deterrence and requiring both defensive and offensive capabilities" with the primary objective of preserving India's use of space.

The forthcoming military doctrine is expected to significantly expand these principles while providing more concrete operational guidelines.

The New doctrine will accelerate growth in the defence space sector specifically, complementing the broader Indian Space Policy 2023.

The 2023 policy had already set out guiding principles to "augment space capabilities; enable, encourage and develop a flourishing commercial presence in space," while creating a "level playing field and favourable regulatory environment for players within the Indian private sector".

The military doctrine will likely further define strategic responsibilities between civilian and military space applications while maintaining India's commitment to peaceful space use.

India's $44 Billion Space Economy Vision

Central to India's space ambitions is the target of developing a $44 billion space economy, a figure specifically highlighted by CDS Chauhan in his latest address.

This target aligns with projections he shared earlier in February 2024, when he noted that "the Indian Space economy is currently estimated to be around $8.4 billion" and "is expected to grow to $44 billion by the year 2033". Achieving this ambitious growth trajectory will require extensive coordination between multiple stakeholders.

"India envisions a $44 billion space economy, which will require strong collaboration between private companies, the armed forces, DRDO (Defence Research and Development Organisation), and IN-SPACe," CDS Chauhan elaborated in his recent statement.

This multi-stakeholder model represents a significant evolution from India's traditionally government-dominated space program, acknowledging the necessity of private sector involvement for rapid advancement.

Private Sector's Pivotal Role

The Chief of Defence Staff has placed particular emphasis on the crucial role private companies will play in India's space future.

"We need to strengthen satellite services, boost manufacturing and launch operations, stimulate the domestic market, and build state-of-the-art infrastructure to position India as a global leader in the space sector," he remarked.

This perspective represents a continuation of the growing support for private space enterprises in India.

In his February address, CDS Chauhan had highlighted the dramatic growth in India's space startup ecosystem, noting "We probably had one Start Up in 2014 which has grown to 204 Start Ups in space sector with 54 additions in 2023 itself. In 2023, we as a nation invested $123 million in the sector bringing the total funding to $380.25 million".

This trajectory is expected to continue under the new doctrine, with private innovation recognised as a key driver of advanced space capabilities.

Practical Military Applications in Orbital Zones

CDS Chauhan has outlined a distinctly pragmatic approach to military space operations, emphasising that military focus should remain on practical, near-Earth applications.

"In space, our focus should be on those orbital regions that directly affect terrestrial warfare and national security, not distant galaxies," he stated. Specifically, he identified the Earth's orbital zones—Low Earth Orbit (LEO), Medium Earth Orbit (MEO), and Geostationary Orbit (GEO)—as the primary domains of interest for military operations.

This practical approach aligns with the principles laid out in earlier doctrine

documents, which recognised that space capabilities had become "a vital determinant of national power" and that "India's growing use of space could make its space assets attractive targets for adversaries".

By focusing military attention on orbital regions with direct security implications, India appears to be prioritising defensive and force-multiplication capabilities rather than pursuing a broader militarisation of space.

The CDS specifically advised military professionals to maintain this focused perspective: "To my fellow members of the armed forces in the audience today: we, as military professionals, need to remain practical and focused.

The realm of interplanetary or intergalactic travel belongs to the world of science fiction for now. Let's leave that exploration to others. Our responsibility lies in clearly defining and operating within the scope of military space."

Regulatory Developments and International Cooperation

The forthcoming Space Activities Bill 2025, which CDS Chauhan described as "a pivotal reform in the space sector," will provide the regulatory framework necessary to support this expanded vision. This will likely build upon earlier drafts of the Space Activities Bill, which was first made public for comments by ISRO in November 2017 and has been under consideration since then.

The bill aims to regulate and promote private participation in India's space sector, creating a conducive environment for growth.

In parallel with these domestic developments, India is actively expanding its international space cooperation. Recent developments include plans for Indian military personnel to formally participate in the US Space Command's annual Global Sentinel exercise in 2025, after having attended as observers in February 2024.

Such international cooperation provides India with valuable experience in space domain awareness and allied space operations, potentially informing the development of its own military space doctrine.

Corollary

The announcement of India's forthcoming Military Space Doctrine represents a significant evolution in the country's approach to space security and defence. By formalising military space operations within a comprehensive doctrine, India is signalling its intent to develop robust space capabilities while maintaining a practical focus on near-Earth applications with direct security implications.

The dual emphasis on military capability and private sector involvement reflects India's balanced approach to space development—seeking security while simultaneously pursuing economic growth.

As the doctrines take final shape in the coming months, they will likely set the course for India's space ambitions for years to come, potentially establishing the country

as a significant space power with well-defined military and civilian space objectives.

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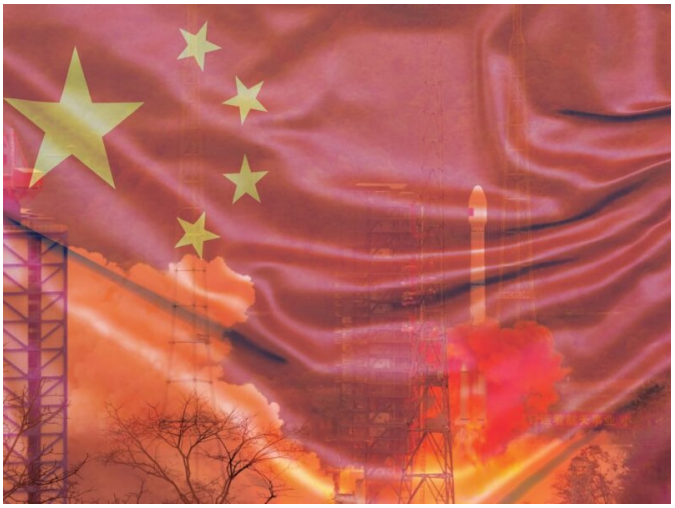
China's Space Capabilities Take Center-Stage at Military SSA Event

Laurence Russell | 07 May 2025

Source: Satellite Today | https://www.satellitetoday.com/government-military/2025/05/07/chinas-space-capabilities-take-center-stage-at-military-ssa-event/



A launch at China's Xichang Satellite Launch Center. Xinhua image and Via Satellite archive illustration

LONDON — Increasing understanding of Chinese spy satellites took center stage at this year's Military Space Situational Awareness Conference in London, which brought together leaders and academics in space data last week.

"The Chinese don't believe there's a separation between Western state satellites and companies that sell to Western governments, believing such satellite markets to be something of a fig leaf," said Dr. Brendan Mulvaney, director of the China Aerospace Studies Institute, which is part of the U.S. Dept. of the Air Force. "Therefore, they are all viable targets as far as China is concerned.

Mulvaney spoke about a number of publicized Chinese projects such as the Tiangong Space Station, the Hainan commercial spaceport, the capacity of Chinese spy satellites, and the international ramifications.

"Xi Jinping has stated the goal of becoming a global superpower in space — to meet and exceed the scientific, technological, and military capabilities of the United States in orbit," Mulvaney said. "That includes deep space and diversified orbits … and eventually space launches with international partners from HICAL, their commercial spaceport on Hainan island. We should not underestimate their ability to do this."

Presentations from ExoAnalytic Solutions, Kratos, and Slingshot Aerospace demonstrated real-time tracking of Chinese satellites supposedly shadowing their American counterparts.

When Hugh White, senior director of Space Domain Awareness Services at Kratos, was asked to speculate on the capabilities of modern Chinese military and intelligence satellites, he said these satellites have "a lot" of capabilities.

"We know that there is downlink & uplink jamming," White said. "There's nothing stopping a spy satellite from maneuvering next to another and broadcasting in the same

frequency range, though I'm not aware of that happening intentionally."

He also echoed the speculation that spy satellites such as the Russian Luch Olymp satellites – widely thought to be spy satellites – have collected upstream traffic intended for the satellites they shadowed in recent years.

A Waking Dragon?

Via Satellite spoke to Mulvaney about his findings of China's space capabilities and ambitions.

"From developing new tactics, techniques, and procedures, to practicing them on orbit, the People's Liberation Army (PLA) continues to advance their space capabilities rapidly," he said. "This accomplishes both a training and deterrence aspect, i.e. they are demonstrating the capability, capacity, and willingness to expend a lot of Delta-v to maneuver their satellites in new and assertive ways."

These moves are the result of decades of concentrated work in China on the nation's science and technology base with authoritative policy levers across academic, industrial, and military spheres.

"In many areas, China has already caught up with the democratic West, in some places they are close on our heels. Without long-term focus and funding, the advantage that the democracies of the world have enjoyed for decades may slip away," he said.

Yet Mulvaney was cautiously optimistic about the potential for a more harmonious future between East and West.

"China is an important member of the international community, and this is especially true in space. The democratic nations of the world need to think carefully about where it is acceptable, and at times beneficial, to work with China on scientific endeavors that do help all mankind, such as deep space exploration, understanding and mitigation of weather-related changes," he said. "But at the same time, must be clear eyed in the dual-use nature of other technologies and how the Party-State apparatus of China will leverage those for military and strategic gain."

He believes cooperation in space between the BRICS intergovernmental organization nations of Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Indonesia, Iran and the United Arab Emirates, and second world nations is 'absolutely' foreseeable.

Mulvaney expects Chinese non-military space companies to become world leaders in providing space launch capabilities and satellites to other nations.

One example is Qianfan, China's "thousand sails constellation," a Low-Earth Orbit (LEO) internet megaconstellation in development from the Shanghai Spacecom Satellite Technology, intended to constitute over 15,000 satellites and rival Starlink.

These activities "will likely start in Asia, but will be very active in Africa and South America as well," he said. "This will provide economic benefits to both China and their

client states. When there isn't an active armed conflict occurring, there is a lot of money to be made in space in the coming decades, and all nations are going to want to take part. China has positioned itself to be in the leading pack."

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Aerospace Industry

Bangalore's Q-Alpha Aerospace Developing AI-Powered QAL-J10 Turbojet Engine for Next-Gen Drones and Hypersonic UCAVs

Raghav Patel | 22 January 2025

Source: Defence.in | https://defence.in/threads/bangalores-q-alpha-aerospace-developing-ai-powered-qal-j10-turbojet-engine-for-next-gen-drones-and-hypersonic-ucavs.12464/

Q-Alpha Aerospace, an innovative aerospace company based in Bangalore, India, has revealed its ambitious project to develop the QAL-J10. This state-of-the-art turbojet engine utilizes artificial intelligence to optimize performance and is intended to power a new generation of unmanned combat aerial vehicles (UCAVs) and advanced drones. The company also envisions the engine as a key component in future hypersonic aircraft development.

The QAL-J10 is a multi-stage engine that generates 10 kilonewtons of thrust and incorporates both an afterburner and an exhaust choking system. Q-Alpha Aerospace emphasizes the engine's meticulous design, based on advanced scientific and mathematical

models, and its compatibility with Turbine-Based Combined Cycle (TBCC) architecture, a technology crucial for achieving hypersonic flight. This forward-thinking design philosophy positions the QAL-J10 as a potential power source for the next generation of high-speed UCAVs.

One of the defining features of the QAL-J10 is its integration of artificial intelligence. This allows the engine to possess a high degree of "system awareness," continuously monitoring its performance and making real-time adjustments to maximize operational efficiency. The engine's software architecture enables it to process data from multiple sensors, providing a comprehensive understanding of its operating environment and allowing it to adapt to varying conditions.

Further enhancing its capabilities, the QAL-J10 utilizes digital twin technology. This creates a virtual replica of the engine, allowing engineers to simulate its performance under a wide range of scenarios, optimize parameters, and gain valuable insights into its operation. This digital twin provides comprehensive situational awareness and facilitates enhanced operational readiness.

Q-Alpha Aerospace believes the QAL-J10 represents a significant leap forward in propulsion technology. By combining cutting-edge Al with advanced design methodologies, the company aims to deliver an engine that not only meets the demands of current UCAV and drone applications but also paves the way for the development of hypersonic platforms in the future.

Natilus Takes on Airbus and Boeing with Blended-Wing Airliner

David Szondy | 09 November 2025

Source: Newsatlas | https://newatlas.com/aircraft/natilus-airbus-boeing-blended-wing/

The Horizon blended-wing airlinerNatilus

Aerospace startup Natilus is taking on the biggest players in civil aviation, unveiling its plans to build its Horizon Blended Wing Body (BWB) passenger/cargo liner that can carry 200 passengers from New York to London with 50% lower emissions.

If you visit any airport, you'll notice that all the airliners have one thing in common. Whether prop or jet propelled, they all have the standard wings-and-cylinder general design that has dominated aerospace architecture since the 1930s. From an engineering point of view, it's a good choice and it's been very successful for decades, but it still leaves something to be desired in terms of things like drag, available space, and general efficiency.

One of the more promising alternatives to the standard configuration is the BWB, where wing and body smoothly blend together with no clear dividing line, as opposed to a flying wing, which, as the name implies, is all wing,

and the lifting body, which is all body without wings. BWB is an idea that's been around since the 1920s and has seen real-world application in the B-1 Lancer nuclear bomber. Now, it may be on the verge of challenging the dominant civilian airliner paradigm.

The advantage of the blended wing design is that it doesn't have a join between the wing and the fuselage, which greatly reduces drag. In addition, the blending of wing and body moves some of the job of lifting the aircraft from the wings to the entire plane, creating more lift for less drag.

In addition, a blended wing aircraft can be made with much more interior space for cargo, passengers, or fuel. The last is particularly important because, with so much interest in making airliners that can run on hydrogen, an aircraft that can accommodate hydrogen tanks and their support mechanisms is an attractive option.

It's in light of this that Natilus wants to develop its blended-wing family with the largest, Horizon, able to carry up to 200 passengers on intercontinental flights with 50% less emissions and burning 30% less fuel. In addition, it will have 40% more volume, putting it in the same payload class as the Boeing 737 and Airbus A320 narrow-body aircraft.

With future demand for airliners exceeding manufacturing capacity and Boeing in major financial trouble, it seems like an opportune time for Natilus to get into the game, but it's still what can only be called a bold strategy. The Big Two in the field are a duopoly for a reason and it won't be easy to challenge them.

True, Natilus is gambling on a major bit of technological innovation and that has often allowed a newcomer to bring down the more established competition, but blended wings do have their drawbacks. For one thing, airports will need to be modified to accommodate them, though the company says that the Horizon is already compatible. And then there is the question of whether passengers want to be in seats where the nearest window is a speck of light in the distance.

Also, there's nothing to keep Boeing or Airbus from switching gears and starting their own blended wing families. And then there's the perennial, let's-just-buy-the-usurper option.

At any rate, the Horizon is expected to be ready for customers early in the 2030s.

"The commercial aviation industry is looking for real solutions to become more sustainable, more efficient, and more profitable," said Aleksey Matyushev, CEO and co-founder of Natilus. "With the Horizon, we're introducing improved aviation economics that benefit the industry while helping safeguard our planet for future generations."

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Making F-35 & Eurofighter "Invisible", UK Rolls Out 'StormShroud' Drones That Could Blind Enemy Radars

Sakshi Tiwari | 04 May 2025

Source: Eurasian Times | https://www.eurasiantimes.com/uks-stormshroud-will-protect-raf-fighters/?amp

RAF StormShroud

The British Royal Air Force (RAF) has unveiled its first-ever Autonomous Collaborative Platform (ACP), StormShroud. It will operate in a manned-unmanned teaming (MUMT) format with crewed fighter jets, including the RAF F-35B Lightning II and Eurofighter Typhoons.

The StormShroud is the first of a new family of Autonomous Collaborative Platforms (ACP) that will fly alongside manned fighter jets to enhance their survivability and assist in air-to-air combat. It is essentially an electronic warfare (EW) drone that will protect RAF fighter jets by knocking out enemy air defences.

On May 2, the Royal Air Force said in a statement: "StormShroud will support RAF F-35B Lightning and Typhoon pilots by blinding enemy radars, which increases the survivability and operational effectiveness of our crewed aircraft."

The service emphasized that the drone's development has been based on the lessons learned from the grinding Ukraine War and other battlefields worldwide.

The RAF said: "The ACP Strategy is clear that the best way to optimise our strength against increasingly sophisticated adversaries is through a blend of crewed and uncrewed autonomous platforms operating together." The service said that the StormShroud is a more adaptable, agile, and cost-effective model that will reduce risks faced by human pilots in contested and hostile environments.

As per the RAF announcement, the StormShroud will be operated by 216 Squadron, supported by the RAF Regiment, and made up of Regular RAF and Royal Auxiliary Air Force (RAuxAF) personnel, alongside other UK Defence personnel. The troops will receive training on how to work in high-threat situations in small teams, the RAF stated.

The unveiling comes as advanced militaries worldwide are introducing loyal wingman-type drones that operate in tandem with crewed fighter jets.

What Do We Know About The StormShroud Drone?

According to the RAF, the StormShroud will conduct operations like Suppression of Enemy Air Defenses (SEAD) to aid its crewed partners. It will essentially render RAF jets "invisible" or more difficult to

track by deceiving or jamming hostile radar systems. While other loyal wingman drones can perform EW ops, that is only one of the many other operations they conduct, unlike the StormShroud.

The StormShroud combines the Tekever AR3 uncrewed air system (UAS) and the Leonardo BriteStorm Electronic Warfare suite.

The StormShroud is based on the Tekever AR3 uncrewed air systems (UAS), which have been extensively deployed (and combat-proven) in Ukraine. With over 10,000 combat hours clocked in Ukraine, the AR3 is a tactical UAS known for its reliability and adaptability. Its endurance is about 16 hours, and it is known for being compact and lightweight.

The StormShroud drone will be equipped with Leonardo UK's BriteStorm electronic warfare system. This system is a "stand-in jammer"—a small, platform-neutral system made to fly ahead of expensive, crewed combat aircraft. When deployed, it targets integrated air defense systems (IADS) by impairing the adversary's radar tracking and targeting capability.

Mark Randall, Campaign Manager for Electronic Warfare at Leonardo, said in a previous interaction: "Platforms installed with a BriteStorm payload can deploy ahead to create confusion so that enemy IADS are unable to detect, track, and attempt to engage friendly assets. Due to the evolution of near-peer IADS capabilities, friendly forces must use BriteStorm to ensure they remain protected."

Unlike traditional stand-off jammers, which are mounted on large aircraft positioned far from the battlefield, Leonardo's stand-in jammer is lightweight, small enough to fit on a drone, and inexpensive enough to be expendable.

The stand-in jamming approach reduces the need for high-power systems, making it more suitable for operations in closer proximity to enemy defenses. Thus, making it ideal for air combat with a near-peer adversary.

When BriteStorm detects an enemy radar signal, it digitally records the radar pulse, analyzes it, and responds with either advanced spoofing techniques or electrical jamming using Leonardo's state-of-the-art Digital Radio Frequency Memory (DRFM) technology. This manipulation can produce dozens of "ghost" fighter jets and other bogus targets, making it hard for the opponent's radars to tell the difference between actual and fake threats.

Additionally, its software-defined architecture allows real-time updates to counter evolving threats, a necessity given the rapid advancements in near-peer IADS.

The StormShroud was developed by the RAF's Rapid Capabilities Office, the Defence Equipment & Support (DE&S) Catalyst team, Defence Science and Technology Laboratories (DSTL), and UK industry.

Notably, while these drones will operate alongside the F-35 and Typhoons, they will not be transported by these fighter jets. They will be fired from the ground using a portable catapult mechanism for which the crew is

currently receiving training. As per reports, the Tekever AR3 can be configured for vertical take-off and landing (VTOL). However, the example displayed by the RAF did not seem to have that capability.

According to Tekever CEO Ricardo Mendes, the primary goal of the AR3 in its StormShroud configuration is to "carry the [BriteStorm] payload" and ensure that "it arrives, it survives where it's needed," particularly in "complex RF" conditions when several aircraft are deployed as a drone swarm.

The RAF intends to acquire a fleet of drones with differing levels of sophistication and cost. "The RAF is investing an initial £19 million into the cutting-edge drones, which are made in the UK and directly support 200 highly skilled engineering jobs at multiple UK locations already, from West Wales to Somerset, with further opportunities expected in the future.

StormShroud is just the first of a family of next-generation drones – known as Autonomous Collaborative Platforms (ACPs) – being delivered to the RAF," a statement from the UK Prime Minister Keir Starmer's office said.

Notably, while parallels have been drawn between the ACP and the US Collaborative Combat Aircraft (CCA), a key difference between the two is that the CCA will also carry additional weapons, whereas the StormShroud will only carry the EW suite. Additionally, the StormShroud is smaller and less survivable than the CCA.

In general, collaborative combat drones provide additional combat effects, supporting crewed aircraft by carrying extra air-to-air munitions, extending sensor coverage, and executing missions that would otherwise put human pilots at risk.

Unlike multi-role "loyal wingman" drones (e.g., U.S. Collaborative Combat Aircraft (CCA) or Australia's Ghost Bat), the StormShroud is purpose-built for electronic warfare (EW), specifically Suppression of Enemy Air Defenses (SEAD). Its sole focus on EW, using the BriteStorm payload, distinguishes it from broader-capability drones that conduct ISR, precision strikes, or carry munitions.

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Safran's 110kN Engine for AMCA Promises Seamless Integration with Indian Rafale Jets, Significantly Increasing Their Combat Effectiveness

Raj Basu | 02 February 2025

Source: Defence.in | https://defence.in/threads/safrans-110kn-engine-for-amca-promises-seamless-integration-with-indian-rafale-jets-significantly-increasing-their-combat-effectiveness.12650/

In a potential game-changer for India's air power, French aerospace giant Safran has offered to develop a powerful 110kN engine tailored for India's Advanced Medium Combat Aircraft (AMCA) program.

What makes this offer particularly attractive is Safran's assertion that this new engine could also be integrated into India's existing and future Rafale fighter jets, providing a substantial boost to their capabilities.

Safran emphasizes that the new 110kN engine will have similar dimensions to the M-88 engines currently powering the Rafale. This compatibility is crucial as it eliminates the need for significant modifications to the Rafale's airframe or engine bay.

This translates to lower integration costs and simplified maintenance for both the Indian Air Force (IAF) and the Indian Navy, which are currently operating 36 and procuring 26 Rafale M jets, respectively. This approach ensures a smooth transition without requiring extensive redesign or structural changes to the aircraft.

The proposed engine upgrade represents a significant leap in power of Rafale from the existing 75kN M-88. This increased thrust has the potential to significantly enhance the Rafale's performance in several key areas.

A higher thrust-to-weight ratio would translate to improved maneuverability and agility, while increased loiter time would allow the Rafale to remain in the combat zone for longer durations.

Furthermore, the added power could enable the aircraft to carry heavier payloads, expanding its weapons carrying capacity and mission versatility.

However, this ambitious project comes with its own set of challenges. Developing and integrating a new engine requires significant investment and time, factors that need careful consideration against the IAF and Navy's immediate operational requirements.

The increased power output might also impact engine life and maintenance intervals, necessitating careful management to ensure the fleet's operational efficiency.

Despite these challenges, the prospect of equipping India's Rafale fleet with a

more powerful engine represents a major advancement in the country's air superiority strategy.

If successful, this initiative could significantly bolster India's defence capabilities and its position in the global aerospace arena.

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Space

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"Our job is to hit the targets, not to count the body bags."

Indian Air Force

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Vice Marshal Anil Golani (Retd).

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